Your body

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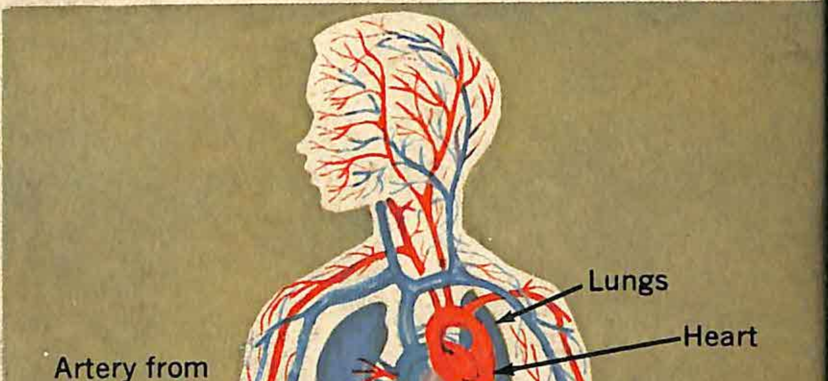

Dolphin
Science
Book 4

ROBERT J. R. FOLLETT

The **Dolphin Science Books** are for children from six to nine years old. The writing is simple but always clear and informative; the vocabulary has been carefully chosen to suit the age group.

These books were first published in America, but text and illustrations have been edited for English children, so that there should be no unfamiliarity.

The author explains in simple language exactly how **your body** works. His text is supplemented by clear diagrams and drawings.

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Your Body

Robert J. R. Follett

Illustrated by Robert Frankenberg
and Lilian Buchanan

University of London Press Ltd, Warwick Square, London E.C.4

On the outside everyone looks different. Boys and girls have different-coloured skins. Some of them have light hair. Some have dark hair. Some are tall. Some are short.

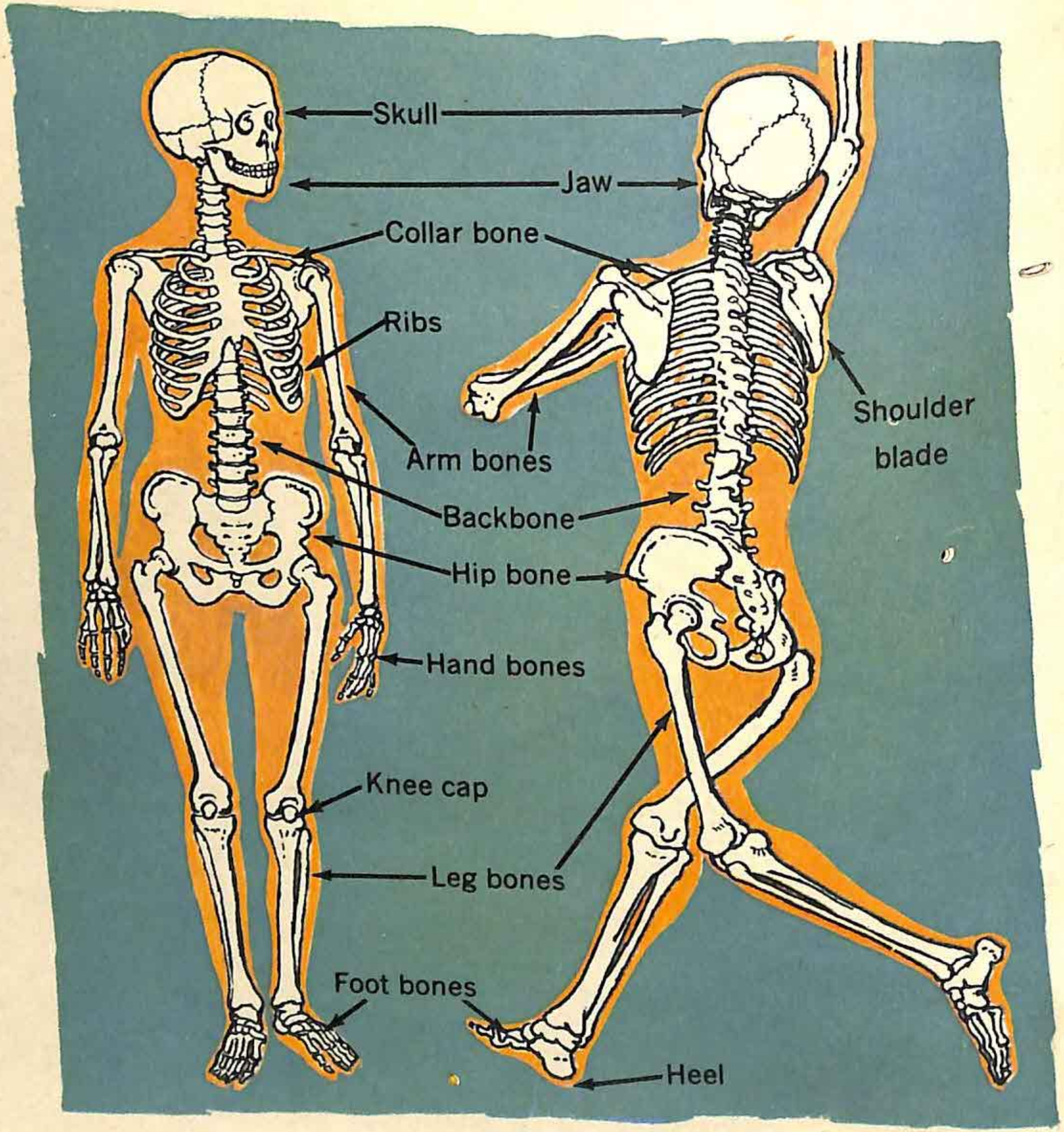
But on the inside everyone is very much alike. There are the same kinds of bones inside everyone. There are the same kinds of muscles. Every boy and girl has a heart and a brain.

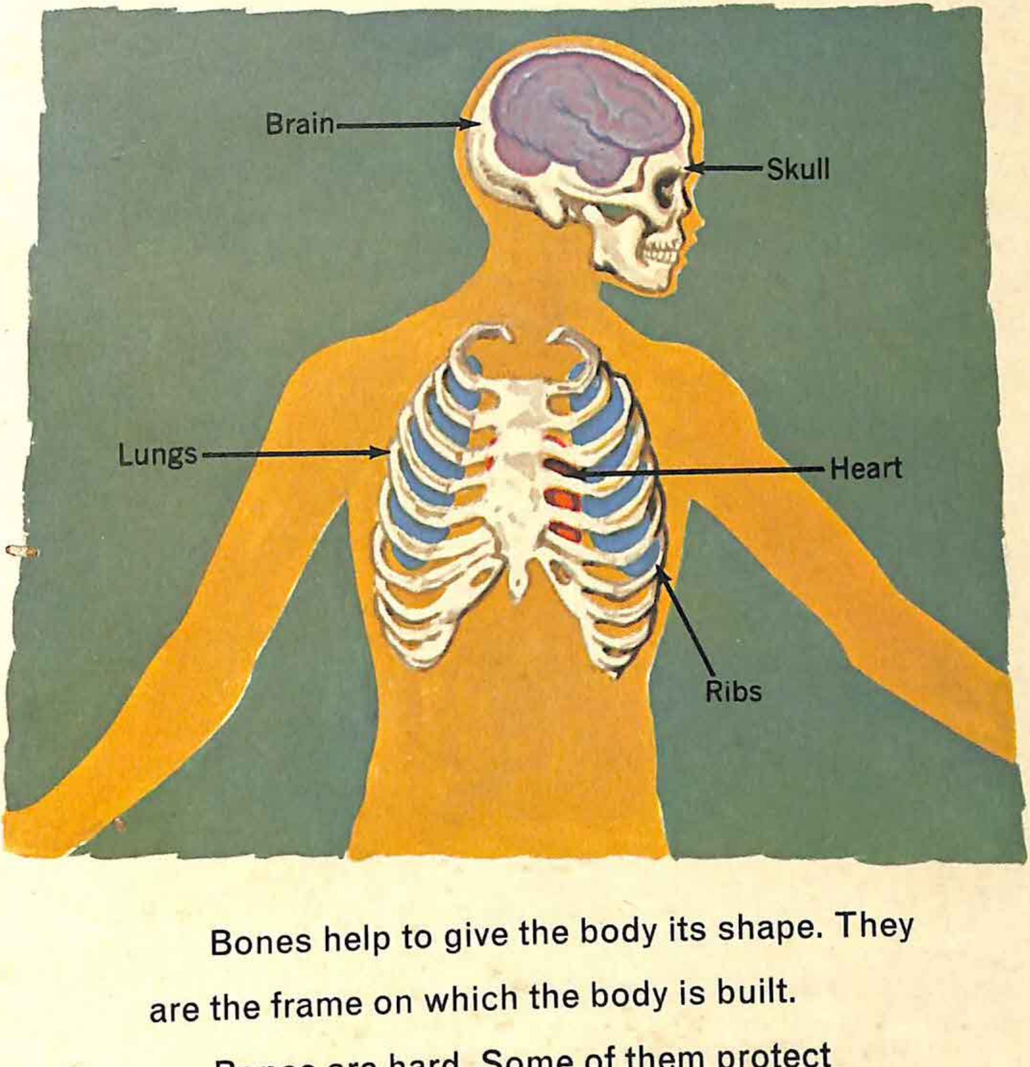
This book will show you what you look like inside.

Don't just look at the pictures. Poke yourself. Feel the bones you see in the pictures. Pinch yourself. Feel your muscles. Move your legs and arms to see how they work.

As you read this book, keep looking at yourself. You will begin to learn how you are made inside. You will begin to find out how your body works.

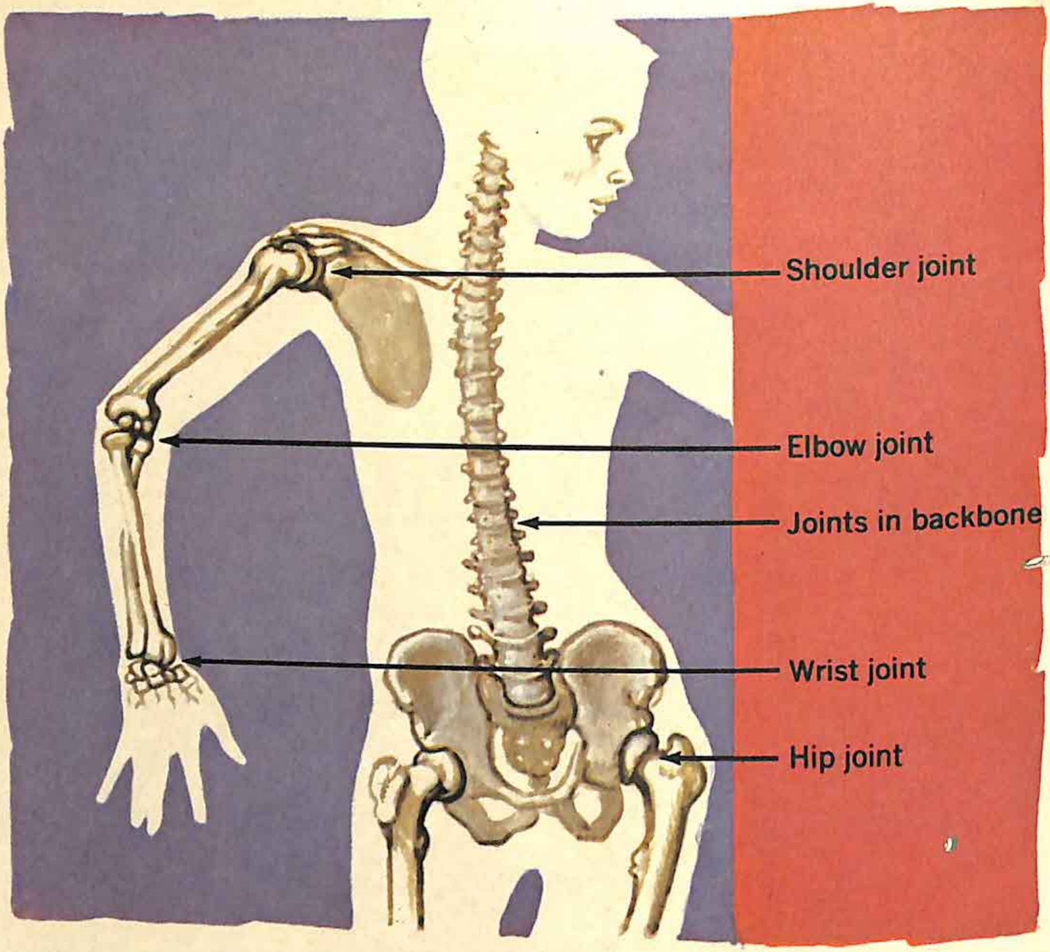
These pictures show the bones in the body. There are over 200 of them. You can feel many of these bones.





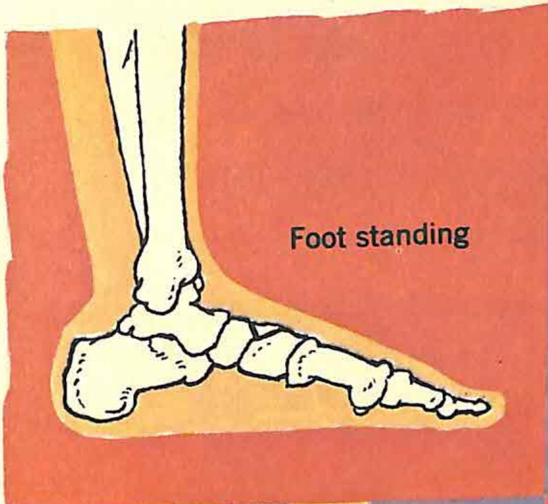
Bones help to give the body its shape. They are the frame on which the body is built.

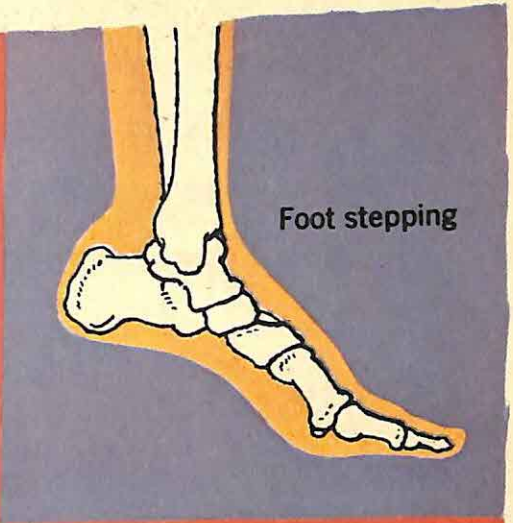
Bones are hard. Some of them protect important parts of the body. The skull protects the brain. The ribs protect the heart and lungs.

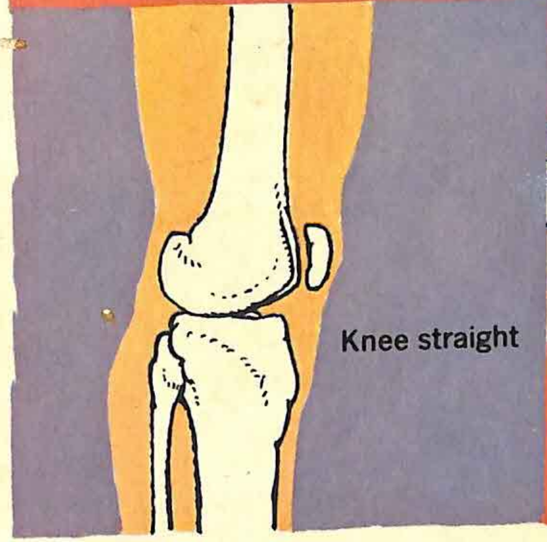


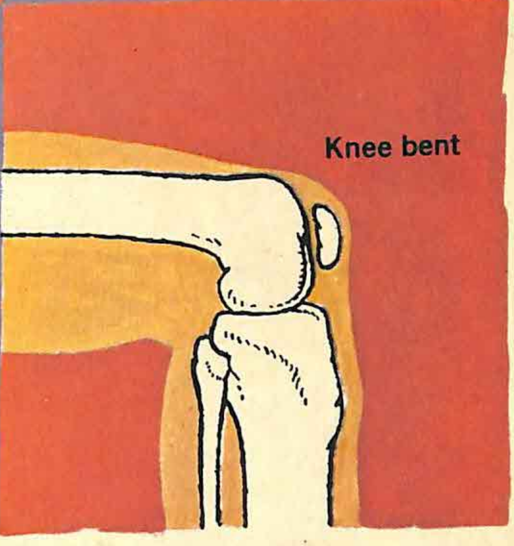
You can move your legs. You can bend your arms. You can turn your head.

This is because bones fit together so that they can move. The places where bones fit together are called joints.









The knee is a joint. The hip is a joint.

There are many joints in the backbone.

How many joints are there in your fingers?

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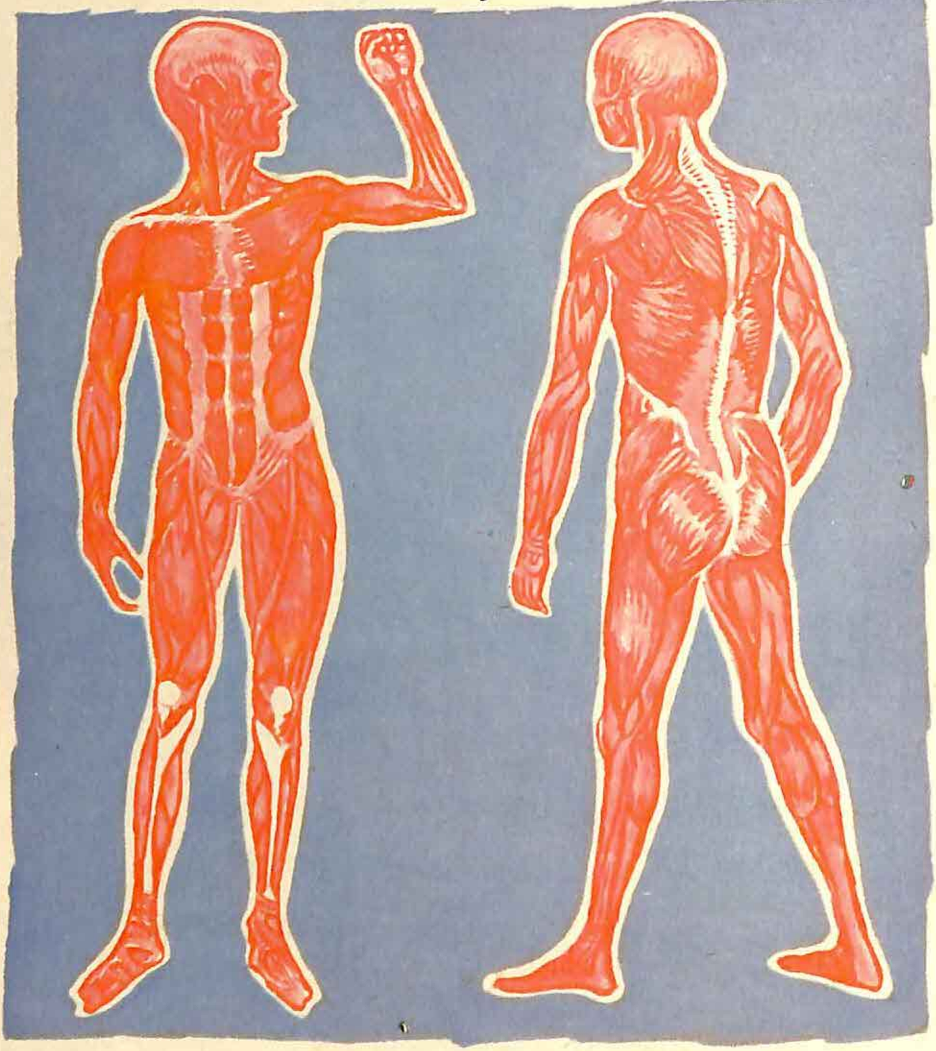
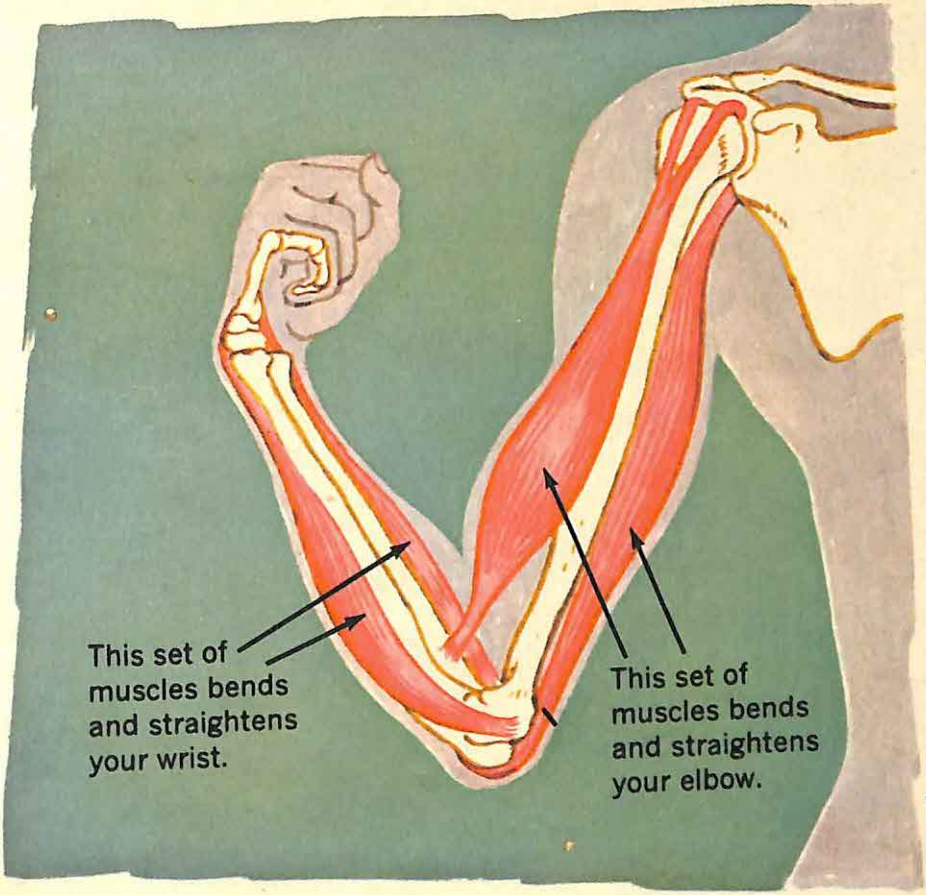
Bones cannot move by themselves. It takes muscles to move bones. Most muscles are connected to bones. Your leg muscles move your leg bones and help you to walk.

This is how your muscles look under the skin.



Other muscles help you to chew. Your heart is a muscle, too.

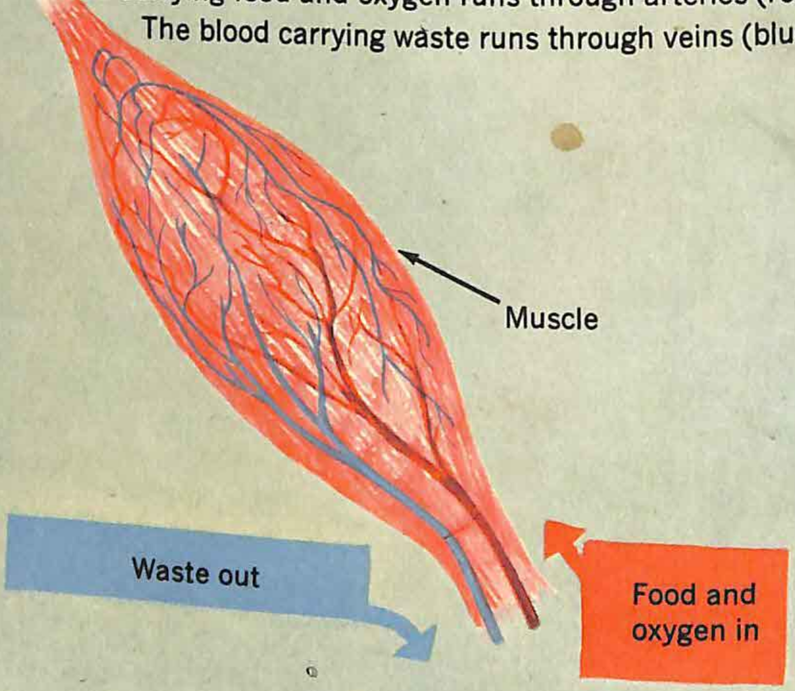
Muscles usually come in sets of two. One muscle pulls one way. Another muscle pulls the other way. Muscles cannot push. They always pull. When you sit, jump, or run, you use many sets of muscles.

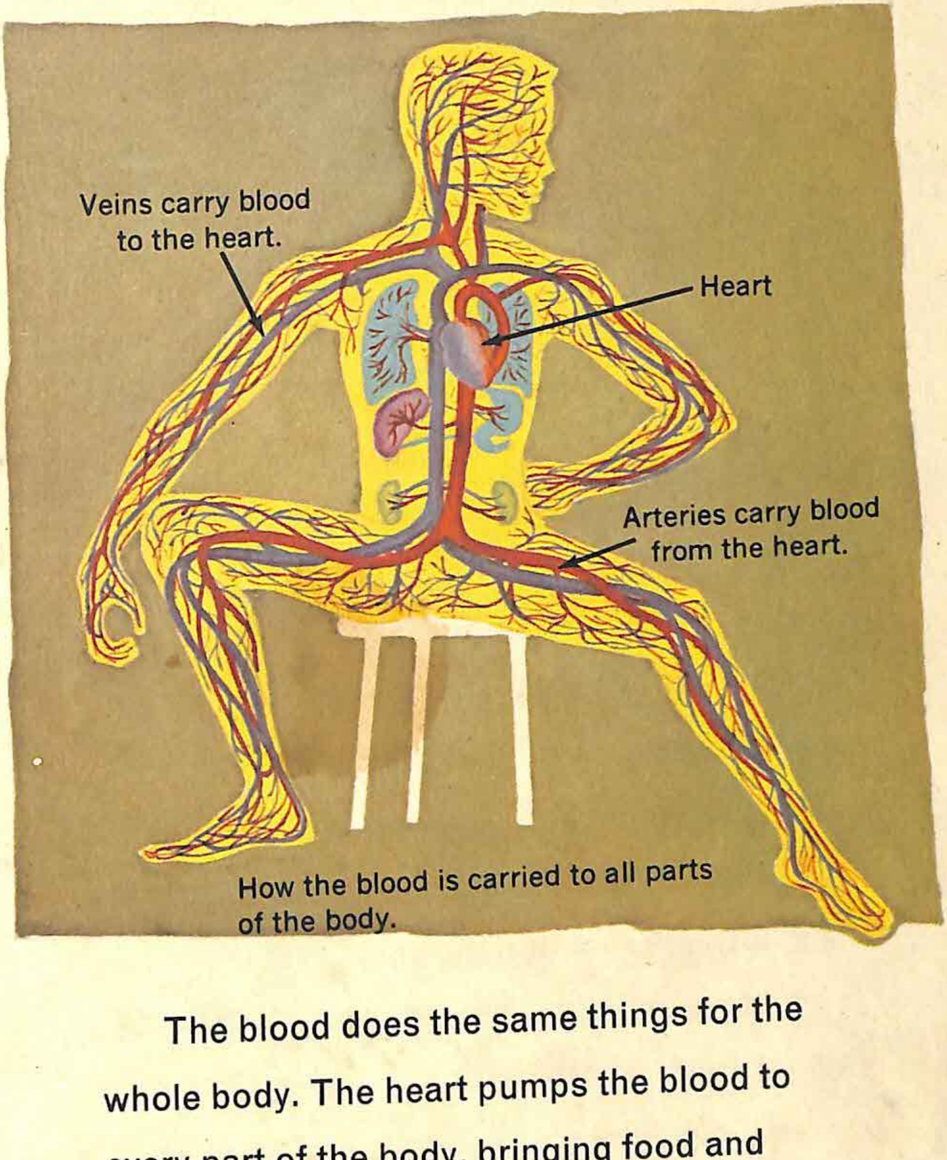

This set of muscles bends and straightens your wrist.
This set of muscles bends and straightens your elbow.

Muscles need three things to do their work. They need food. They need oxygen, a gas that is in the air. They need a way to get rid of waste.

The blood does three things for the muscles so that they can do their work. The blood carries food to the muscles. The blood carries oxygen to the muscles. The blood carries waste away from the muscles.

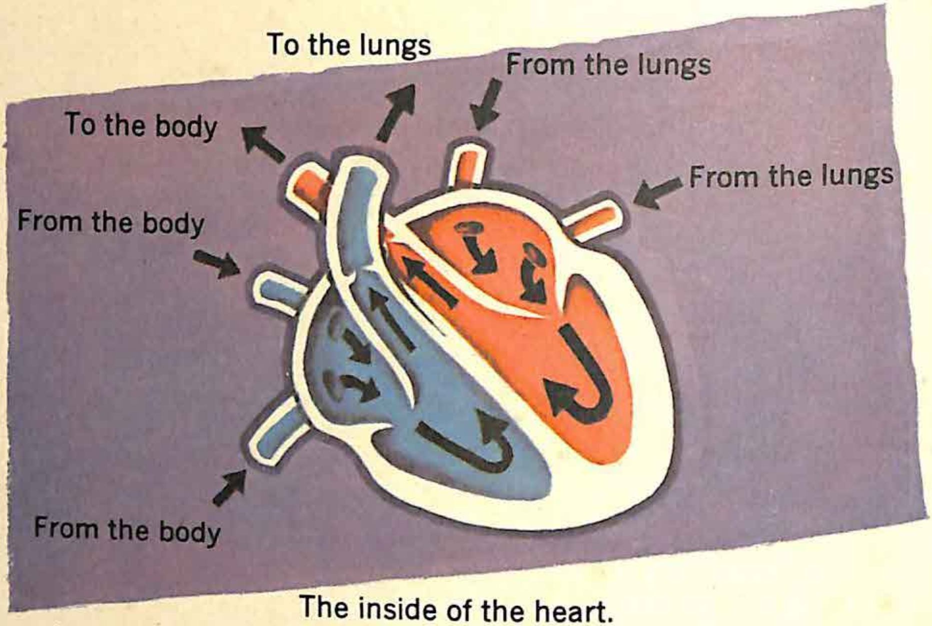
The blood carrying food and oxygen runs through arteries (red). The blood carrying waste runs through veins (blue).




Veins carry blood to the heart.
Heart
Arteries carry blood from the heart.

How the blood is carried to all parts of the body.

The blood does the same things for the whole body. The heart pumps the blood to every part of the body, bringing food and oxygen and carrying off waste.

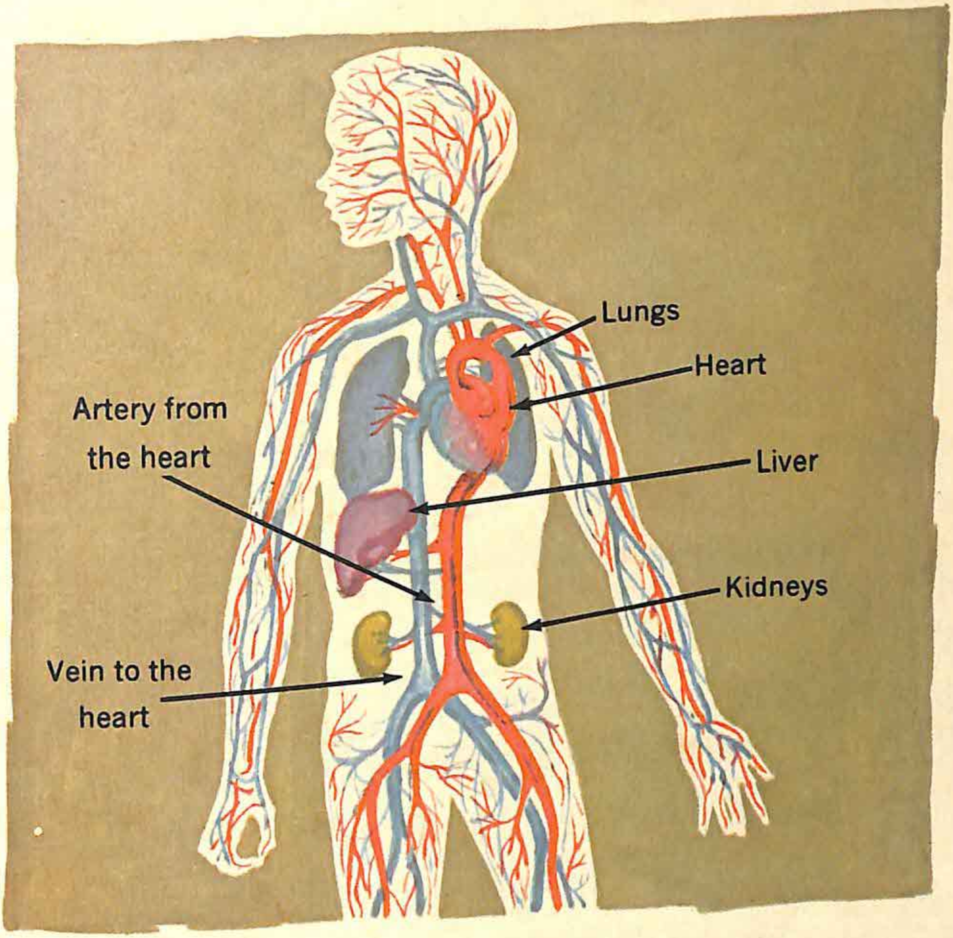


The inside of the heart.

The heart is a big strong muscle. It pumps blood to your lungs, where the blood gets oxygen from the air you breathe. In the lungs the blood gets rid of some of the waste. This waste is a gas called carbon dioxide.

The heart pumps blood to the kidneys. The blood gets rid of other waste in the kidneys.

Your heart will keep on pumping blood as long as you live.



When you work hard, your muscles use more food and oxygen. Your muscles need to get rid of more waste.

This is why the heart pumps faster when you run or play.

How does food get from your mouth to the blood? First, the food is chewed. Then it is swallowed.

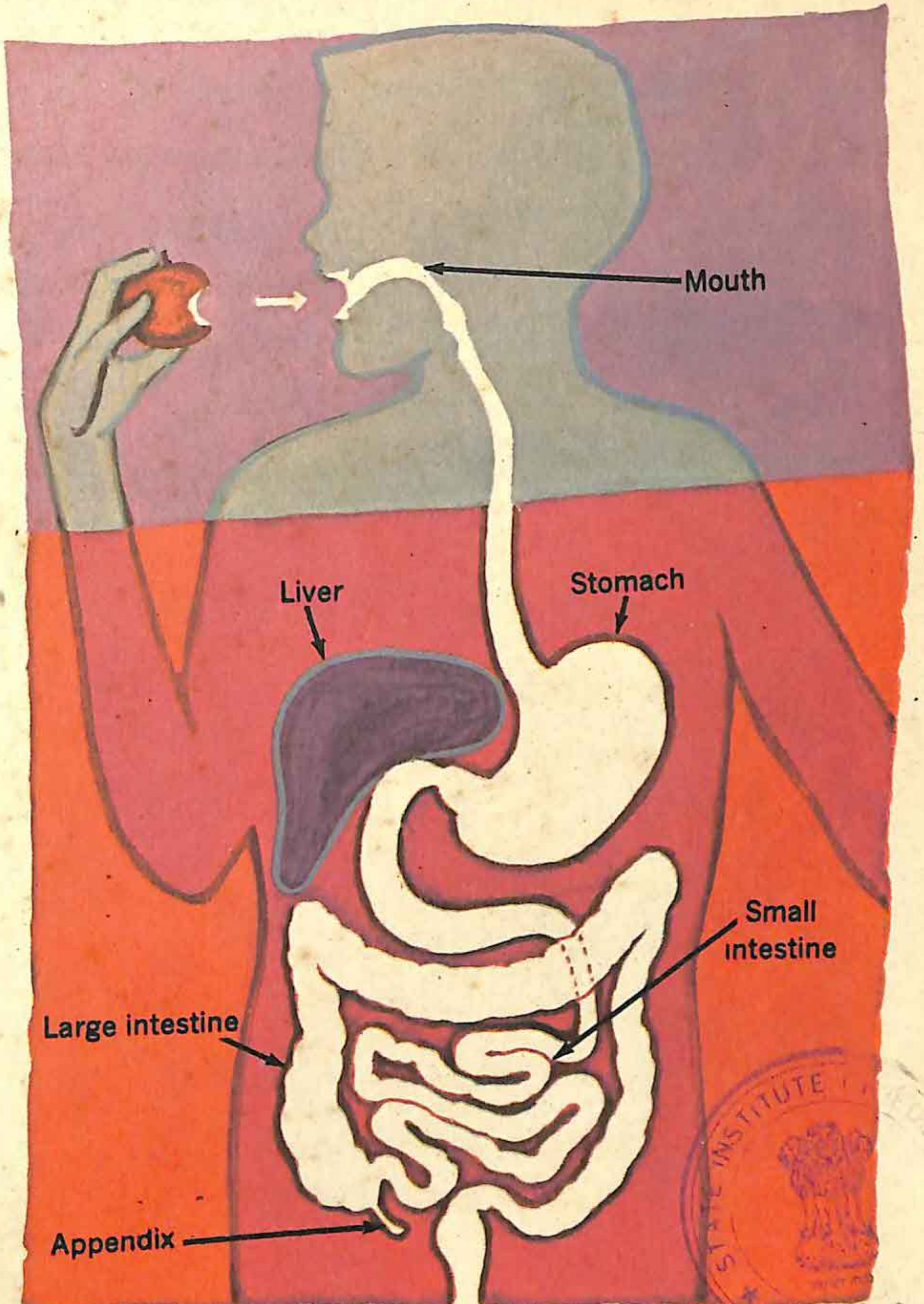
The food goes down into the stomach. There it is churned about until most of it is like soup. Strong juices work on the food.

The food passes into the intestines. In the small intestine, juices get the food ready to be used by the body. Some of these juices come from the liver.

The part of the food the body can use then passes through the walls of the small intestine and into the blood.

Some of the digested food goes to the liver. It is stored there until the body needs it.

The parts of the food that cannot be used go on into the large intestine. This is waste. Later, this waste passes out of the body.



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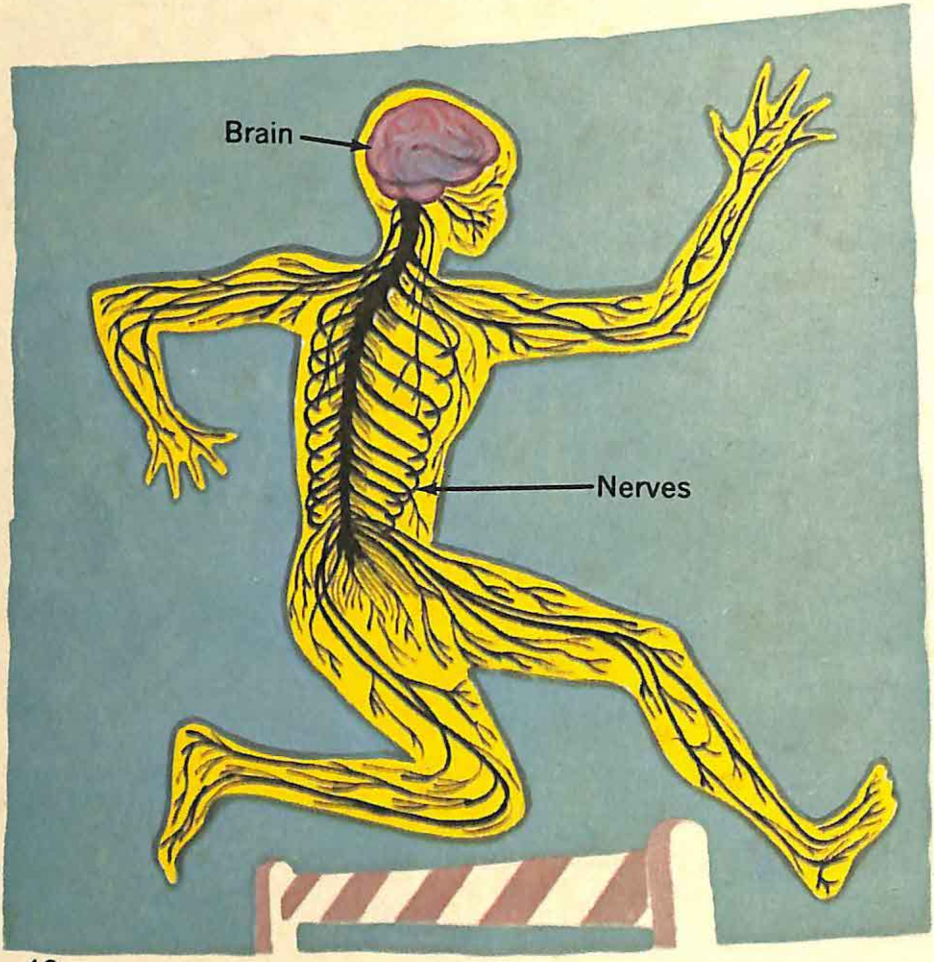
How do muscles know when to work? Messages from the brain tell most muscles when to work. These messages travel in the nerves.

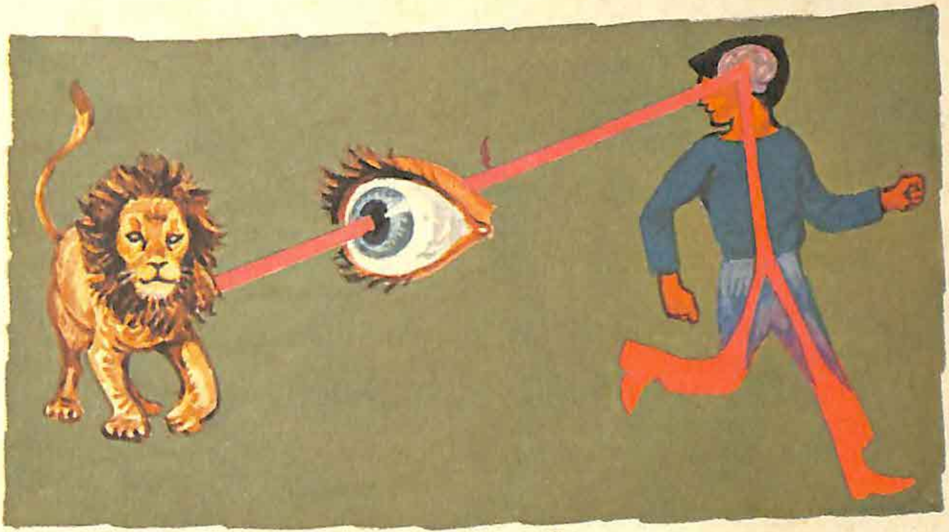
Nerves are like tiny electric wires. The nerves run from the brain to all parts of the body.

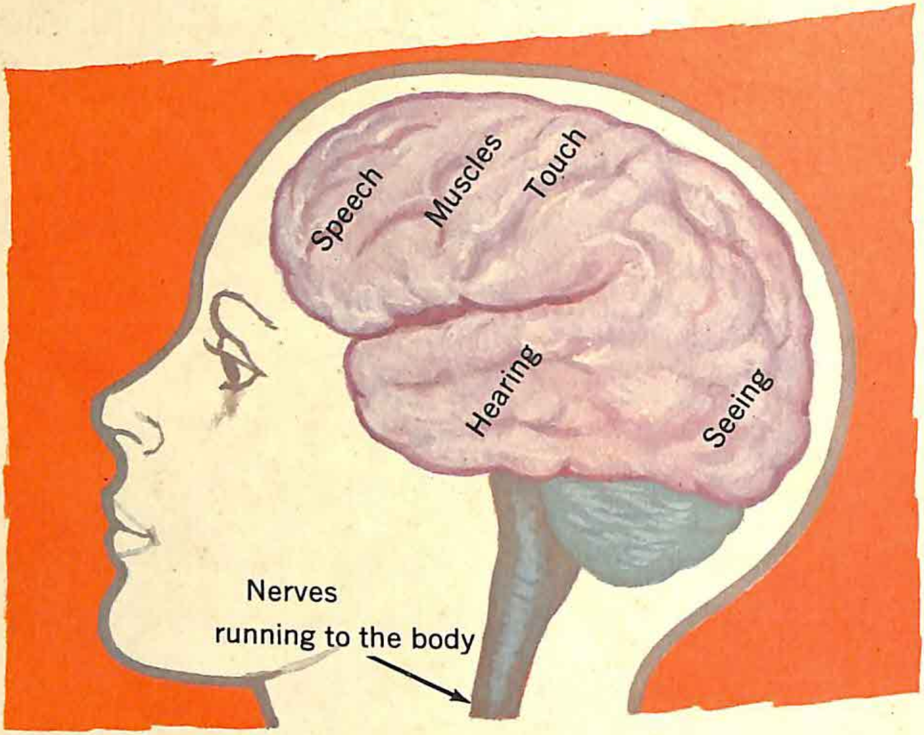


How does the brain decide what messages to send to the muscles? The brain gets messages from the eyes and ears and nose and tongue and skin. Messages come from the stomach and from all parts of the body.

When you see something, a message goes from the eyes to the brain. Then the brain decides what to do. If you see a dog, the brain may decide to do nothing. If you see a lion in the street, the brain may decide to do something. Then it sends messages to the muscles.

"Run," these messages say.

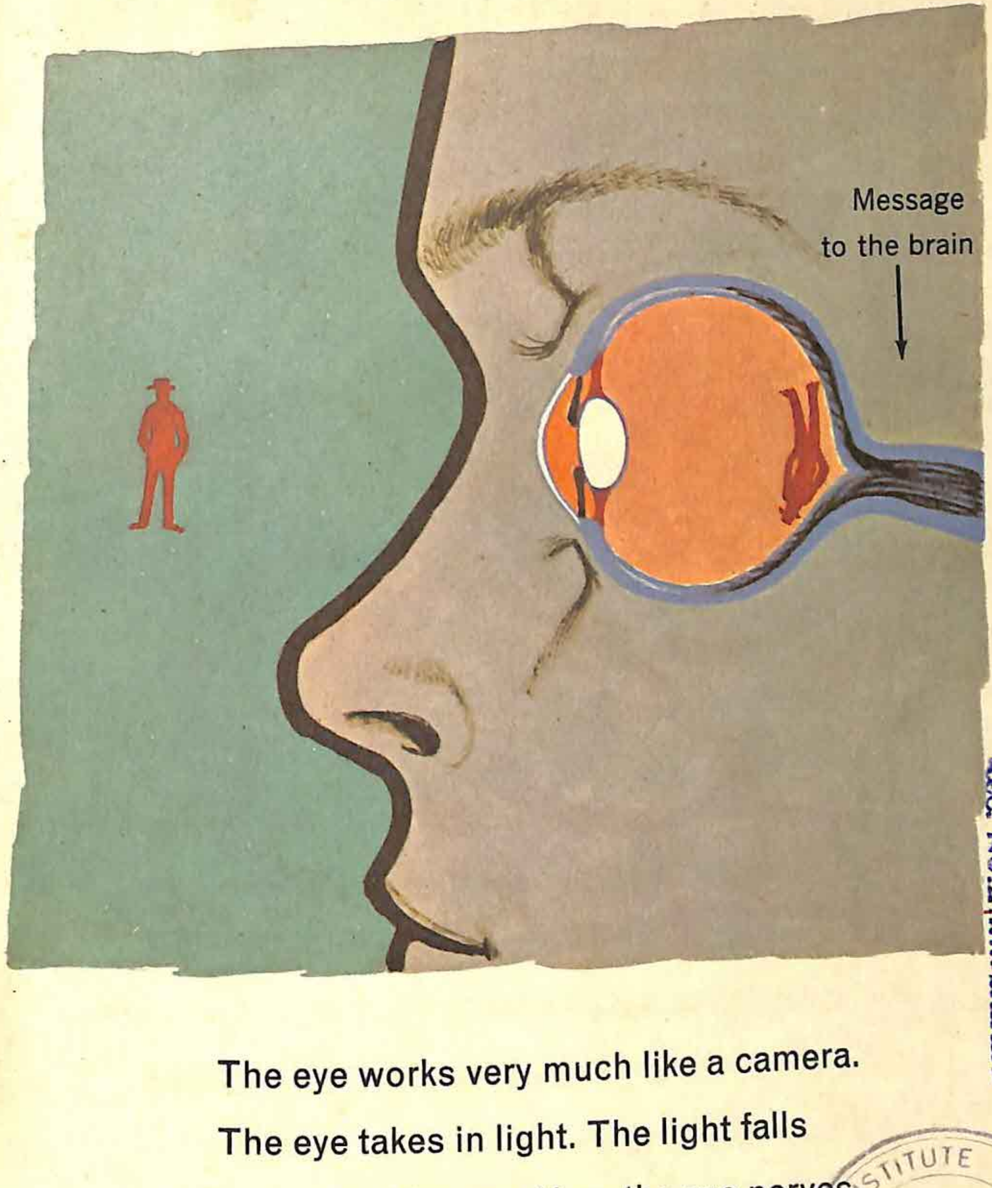




There are millions of tiny nerves in the brain. They are connected together. Different parts of the brain control different parts of the body.

We do not know how the brain does many things. We do not know how it helps us to read or to tell good things from bad things.

We do know that the brain is the most wonderful part of the body.



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The eye works very much like a camera. The eye takes in light. The light falls on the back of the eye. Here the eye nerves send a picture message to the brain.

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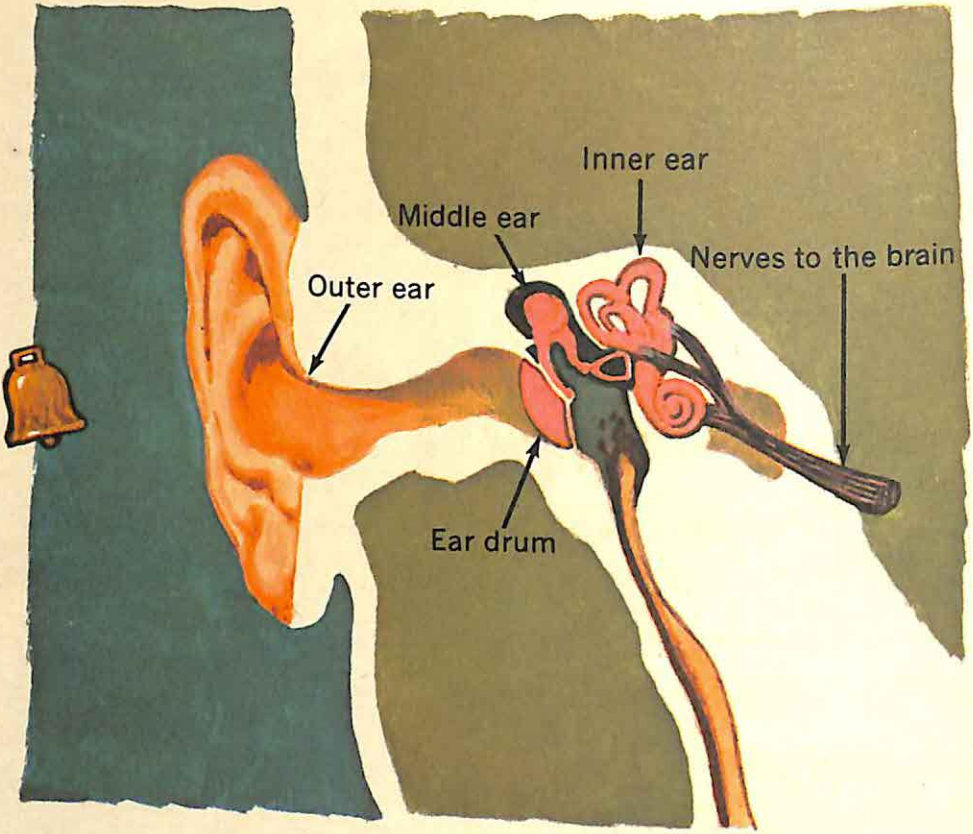
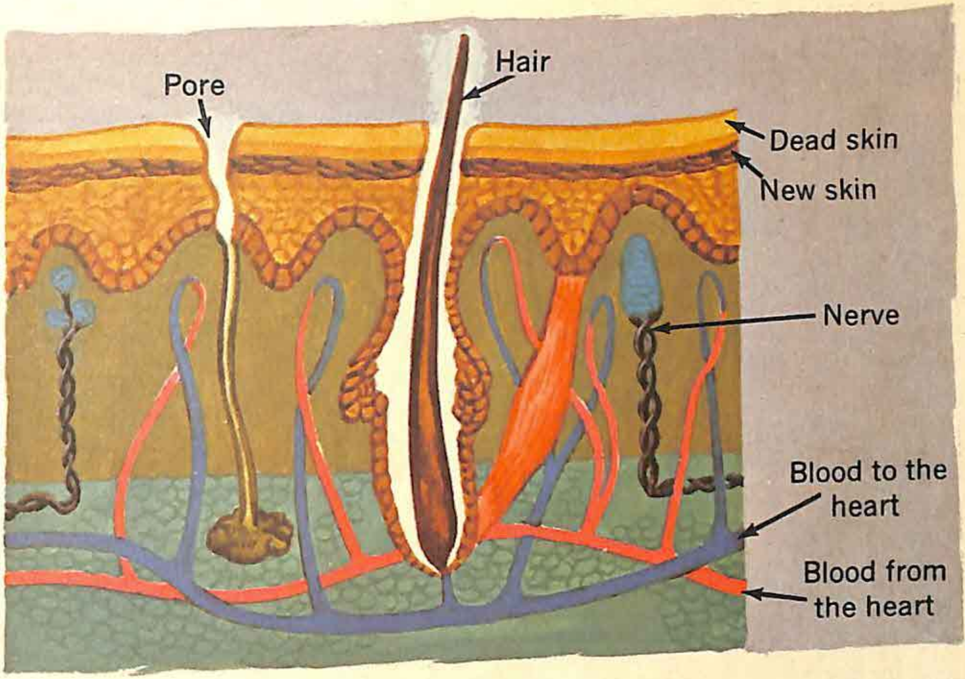


There are three parts to the ear. The outer ear catches the sound. The sound makes the ear drum move or vibrate.

Bones in the middle ear carry the vibrations of the ear drum to the inner ear.

In the inner ear, nerves get the sound message to carry to the brain.

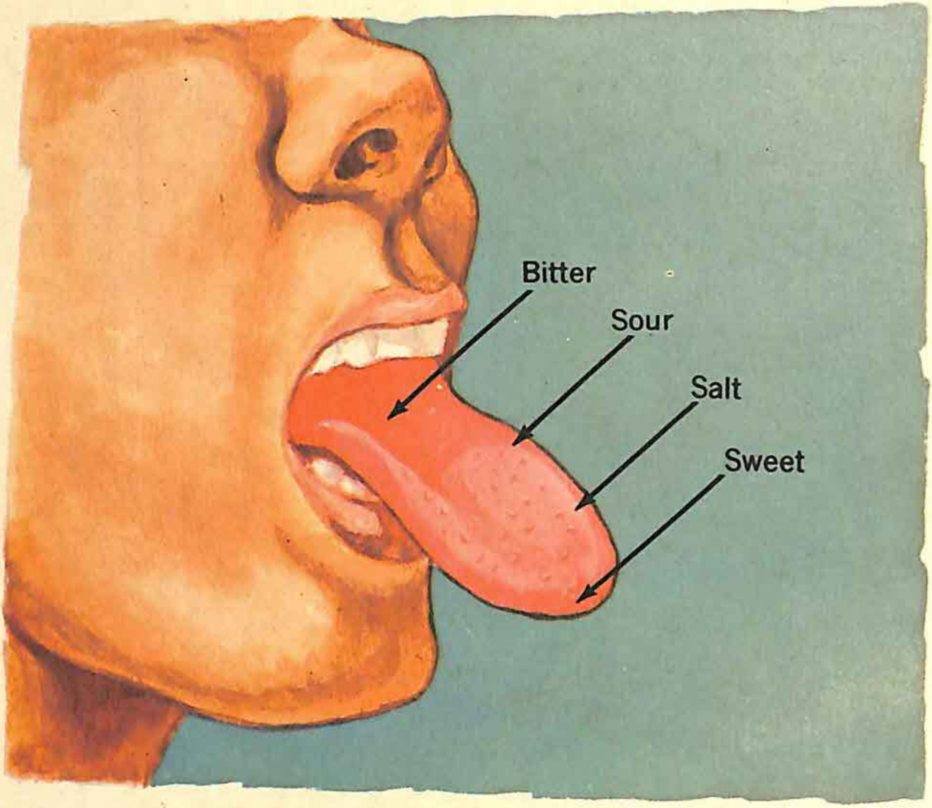


You can feel many different things. You can feel heat and cold. You can feel a touch. You can feel pain.

The messages of each kind of feeling go through different nerves to the brain.

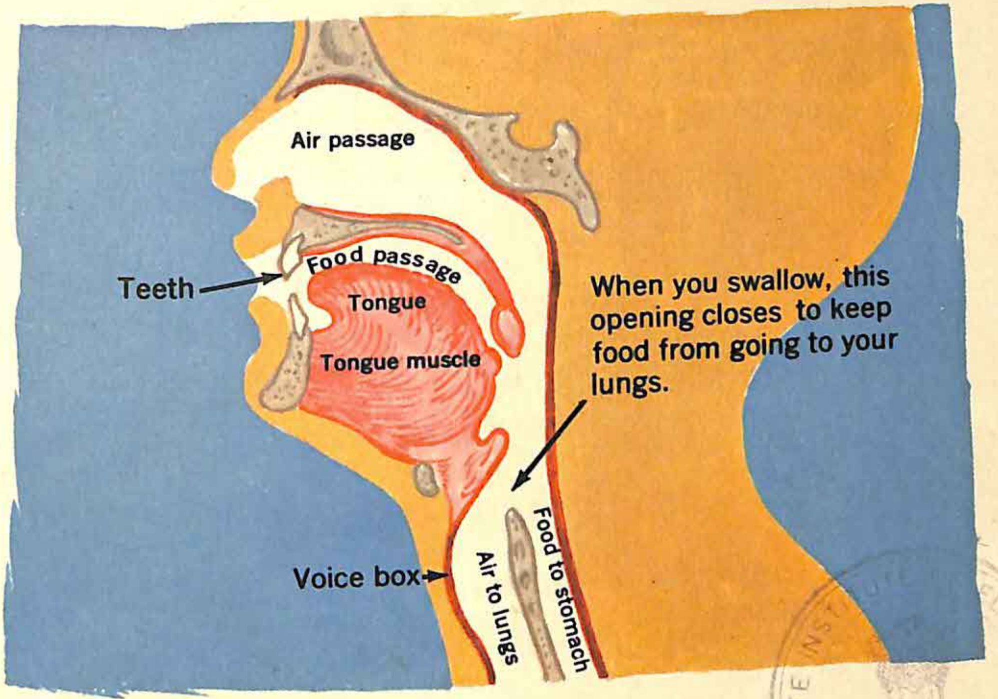
There are many nerves in the skin on the fingers. That is why you can feel so well with your fingers.

There are few nerves in the skin on the back of the neck. You cannot feel well there.



You taste with your tongue. One part of the tongue tastes sweet things. Another part tastes sour things. Another part tastes bitter things. Another part tastes salt.

When your nose is stopped up by a cold, you do not taste very well. That is because smelling is an important part of tasting.



When you swallow, this opening closes to keep food from going to your lungs.

Your nose can tell the difference between hundreds of smells. It lets you enjoy the good smells of food and the sweet smells of flowers.

Besides smelling, your nose does other important things for your body. It warms the air you breathe before it goes to your lungs. It catches some of the dust in the air and keeps it from going to your lungs.

Some very important parts of your body are called glands. When you cry, tears come from one of these glands. Another gland keeps your mouth moist.

Other glands send material through the blood. One of these glands sends material that helps you to grow. If this gland does not work properly, you may grow very large or very small.

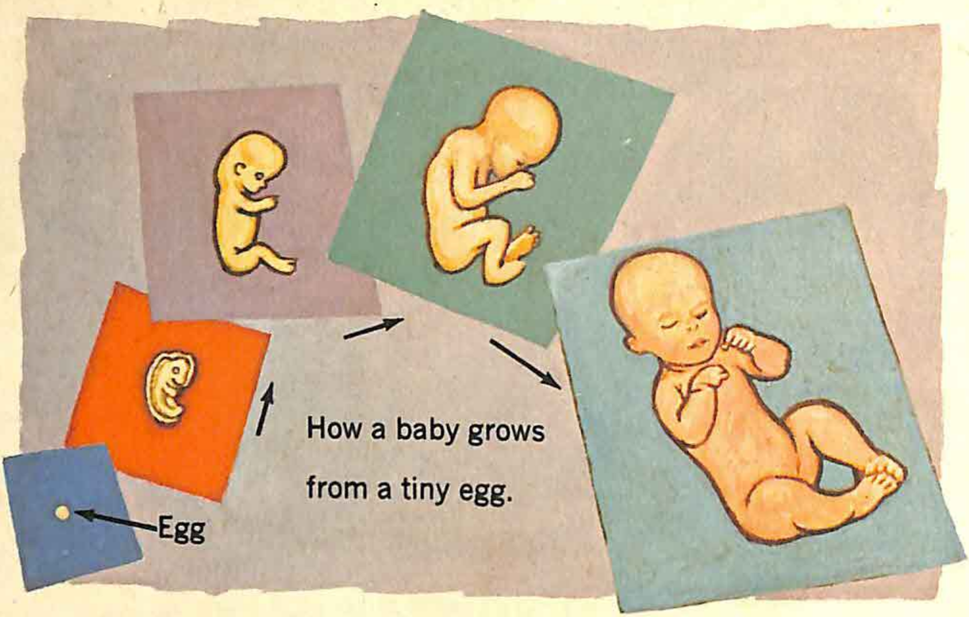
Many glands work with the brain. When you are afraid, these glands and the brain work together. They help you to run faster than you think you can.

Your whole body is covered with skin. Your skin is growing all the time. Dead skin is rubbed off every day and new skin takes its place. When you cut yourself, new skin closes the cut.

The skin keeps us from getting too hot. Blood running in the skin is cooled by the air. Sweating helps to keep us cool, too. When you run, you get hot. Then you sweat. Sweat comes from tiny openings in your skin called pores.

Skin helps to keep germs from entering the body. It is very important to keep the skin clean.

Washing keeps dirt from getting into the pores. It gets rid of dead skin, germs, and dirt. A bath makes your body feel fresh, too.



How a baby grows from a tiny egg.

Your body is a wonderful thing. It has thousands of parts. All of them fit together. All of them work together.

All of the parts grew from a tiny egg, too small to see. The egg grew and grew. It changed and changed. Finally it grew into a body.

Your body can move. It can read and talk. It may build jet planes and fly them. It may write beautiful music and then play the music on the piano.

Your body can do wonderful things.

But this body is the only one you will have. Give it the best care you can. Eat good foods. Get plenty of sleep. Sit straight and stand straight.

Your body needs to work to be strong and well. Use your muscles to work and play games. Use them to walk and to run.

Your brain needs to work, too. The more you use your brain the better it will be.

Take care of your wonderful body and brain.

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Things you can do

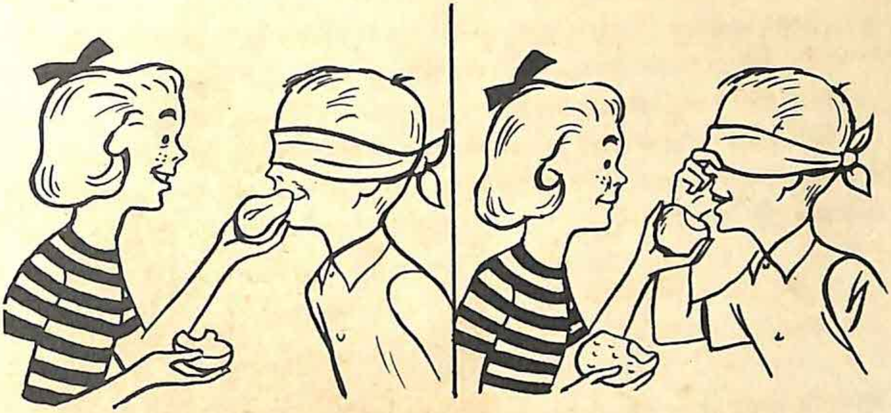
Here are some experiments you can do. The next time you have chicken for dinner, ask your mother for a drumstick. This is a bone from one of the chicken's legs. Eat all the meat from the drumstick. Now look at the bone carefully. See how light it is. But it is strong too, because it will be very hard for you to break the bone in two. If you can get some strong vinegar, pour the vinegar into a large jar and put the bone in it. Screw the cap on and let the bone stay in the vinegar for at least a week. Take the bone out and rinse it with water. The bone will be soft now, and you can bend or twist it easily.

All bones have a mineral in them called calcium, which helps make the bone strong. The vinegar dissolved the calcium in the bone, and the bone became soft. Milk has calcium in it. What do you think milk will do for your bones?

You cannot see your heart beat, but you can feel it beating. It causes the blood to pulse through your body. One of the places where you can feel this pulse is at your wrist. Touch the first two fingers of one hand to the wrist of your other hand. You may have to move your fingers about a little to get the right spot. If you still cannot find the spot, your mother or father will help you. This is called "feeling your pulse", and you can feel a push-push-push as the blood moves past the spot.

Feel your pulse. Then jump up and down 10 or 20 times. Now feel your pulse again. See how much faster it is beating. This is because the heart must pump faster when you are running, jumping and having fun. If you like, count the number of pulse beats for a full minute while you are sitting quietly. Then jump up and down for a while, and count the number of pulse beats again for a full minute. There will be a big difference in the number of pulse beats.

You use your tongue to taste things. But did you know that you



also use your nose for tasting? Peel an apple and a raw potato. Take a slice of each one. Now blindfold one of your friends. Make him hold his nose while he chews one slice and then the other. Your friend will have a hard time knowing what he is eating.

Blindfold your friend again, but this time he does not have to hold his nose. Get a slice of apple and a slice of pear. Give him the apple to eat, but at the same time hold the slice of pear under his nose. He will tell you he is eating the pear.

You have learned that nerves send messages to your brain. There are nerves all over your body. In some parts there are many nerves bunched close together. In other parts the nerves are farther apart. You can test this with a sharp pencil point. Touch the pencil point lightly to different parts of your hand and your arm. You will feel the pencil point more strongly in those parts where the nerves are close together. Try the experiment again on other parts of your body.

We use both of our ears to tell us where sounds are coming from. To show this, ask one of your friends to sit on a chair, then blindfold him. Now stand in one spot and tap two pencils together. Ask your friend to point to the place where he thinks the sound is coming from. Move around to different spots. Stand in front of him, behind him, to his right, to his left, high and low. Tap the two pencils every time you are in a new spot and tell your friend to point to the spot where he thinks you made the sound.

Now get your friend to cover one of his ears with his hand. Do the experiment again. This time he will find it much harder to point to the right spot.

Words younger children may need help with

(Numbers refer to the page on which the word first appears)

4 bones
muscles
heart
brain
6 skull
collar
jaw
shoulder
ribs
backbone
hip
knee
7 lungs
shape
protect
8 elbow
joint
wrist
9 finger
10 connected
11 usually
12 oxygen
waste
arteries
veins
14 carbon dioxide
kidneys
15 liver
16 stomach
churned
intestines
digested
17 appendix
18 message
nerves
electric
wires
19 decide
tongue
20 control
21 camera
22 vibrate
vibrations
23 pore
24 sour
bitter
26 glands
moist
material
27 sweat(ing)
germs
30 pulse

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Dorothy Wood

7 **Rocks and Minerals**
Lou Williams Page

8 **Sound** Charles D. Neal

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